Ch 5 Representative Problems

Section 5.1:

→ A particle starts at x = 0 and moves along the x-axis with $v(t) = t^2 + 1$, for $t \geq 0$. Where is the particle at $t = 4$ seconds? Approximate with 4 intervals using the LRAM, RRAM, and MRAM models.

→ See also example 3 and problem #23.

Section 5.2:

→ Write the following limit as a definite integral over the interval [2, 3]: $\lim_{n\to\infty} \sum_{k=1}^{n} \frac{1}{1-c_k}\Delta x$.

→ Use areas to evaluate the integral, $\int_a^b x\,dx\,,\ a > 0$.

Section 5.3:

→ Find the average value of $f(x) = 4 - x^2$ on the interval [0, 3]. Does f actually take on this value during the interval, if so where? Is this necessary? Why or why not?

Section 5.4:

→ The graph of the continuous function f with domain [0, 8] is shown.
Let h be the function defined by $\int_1^x f(t)dt$.

a) Find $h(1)$.
b) Is $h(0)$ positive or negative? Justify your answer.
c) Find the value of x for which $h(x)$ is a maximum.
d) Find the value of x for which $h(x)$ is a minimum.
e) Find the x- coordinates of all points of inflections of the graph of $y = h(x)$.

→ Find $\frac{dy}{dx}$ of $\int_{x^2}^{x^3} \cos(2t)\,dt$.

→ Evaluate $\int_0^{\frac{\pi}{3}} 4\sec(x)\tan(x)dt$.

→ See also Sect. 5.3 #19 – 30 and Sect. 5.4 #27 – 40.

Section 5.5:

→ Approximate $\int_1^2 \frac{1}{x}dx$ using the Trapezoidal Rule, Simpson's Rule, and then find the exact value using the Fundamental Theorem.

→ See also #9 and 29.